

WHAT IS CLAIMED IS:

1. An internal combustion engine, comprising:

an engine preheating apparatus which preheats the internal combustion engine upon or before starting thereof; and

an air-fuel ratio controller which sets an air-fuel ratio of the internal combustion engine that is preheated by the engine preheating apparatus to a value higher than the air-fuel ratio of the internal combustion engine that is not preheated by the engine preheating apparatus.

2. An internal combustion engine according to claim 1, wherein the air-fuel ratio controller changes the air-fuel ratio according to a temperature of the internal combustion engine upon completion of preheating of the internal combustion engine.

3. An internal combustion engine according to claim 1, wherein the engine preheating apparatus comprises:

a heating medium flow path which is formed in the internal combustion engine and allows a heating medium to pass therethrough,

a heat accumulating apparatus which accumulates heat of the heating medium, and

a heating medium supplying apparatus which supplies the heating medium in the heat accumulating apparatus to the heating medium flow path upon or before starting of the internal combustion engine.

4. An internal combustion engine according to claim 1, further comprising an intake air amount controller which sets an intake air amount of the internal combustion engine that is preheated, to a value larger than the intake air amount of the internal combustion engine that is not preheated.

5. An internal combustion engine, comprising

an engine preheating apparatus which preheats the internal combustion engine upon or before starting thereof; and

an ignition timing controller which retards an ignition timing of the internal combustion engine that is preheated by the engine preheating apparatus as compared with the ignition timing of the internal combustion engine that is not preheated.

6. An internal combustion engine according to claim 5, wherein the ignition timing controller changes a degree of retarding the ignition timing according to a temperature of the internal combustion engine upon completion of preheating of the internal combustion engine.

7. An internal combustion engine according to claim 5, wherein the engine preheating apparatus comprises:

a heating medium flow path which is formed in the internal combustion engine and allows a heating medium to pass therethrough,

a heat accumulating apparatus which accumulates heat of the heating medium, and

a heating medium supplying apparatus which supplies the heating medium in the heat accumulating apparatus to the heating medium flow path upon or before starting of the internal combustion engine.

8. An internal combustion engine according to claim 5, further comprising an intake air amount controller which sets an intake air amount of the internal combustion engine that is preheated, to a value larger than the intake air amount of the internal combustion engine that is not preheated.

9. An internal combustion engine, comprising:

an engine preheating apparatus which preheats the internal combustion engine upon or before starting thereof;

an air-fuel ratio controller which sets an air-fuel ratio of the internal combustion engine that is preheated by the engine preheating apparatus to a value higher than the air-fuel ratio of the internal combustion engine that is not preheated; and

an ignition-timing controller which retards an ignition timing of the internal combustion engine that is preheated as compared with the ignition timing of the internal combustion engine that is not preheated.

10. An internal combustion engine according to claim 9,

wherein the air-fuel ratio controller changes the air-fuel ratio according to a temperature of the internal combustion engine upon completion of preheating of the internal combustion engine.

11. An internal combustion engine according to claim 9, wherein the ignition timing controller changes a degree of retarding the ignition timing according to a temperature of the internal combustion engine upon completion of preheating the internal combustion engine.

12. An internal combustion engine according to claim 9, wherein the engine preheating apparatus comprises:

a heating medium flow path which is formed in the internal combustion engine and allows a heating medium to pass therethrough,

a heat accumulating apparatus which accumulates heat of the heating medium, and

a heating medium supplying apparatus which supplies the heating medium in the heat accumulating apparatus to the heating medium flow path upon or before starting of the internal combustion engine.

13. An internal combustion engine according to claim 9, further comprising an intake air amount controller which sets an intake air amount of the internal combustion engine that is preheated to a value larger than the intake air amount of the internal combustion engine that is not preheated.

14. A method for controlling an internal combustion engine, comprising the steps of:

preheating the internal combustion engine upon or before starting thereof; and

setting an air-fuel ratio of the internal combustion engine that is preheated to a value higher than the air-fuel ratio of the internal combustion engine that is not preheated.

15. A method according to claim 14, wherein the air-fuel ratio is changed according to a temperature of the internal combustion engine upon completion of preheating of the internal combustion engine.

16. A method according to claim 14, wherein the step of preheating the internal combustion engine comprises:

introducing a heating medium into the internal combustion engine,

accumulating heat of the heating medium in a heat accumulating apparatus; and

supplying the heating medium from the heat accumulating apparatus, to a heating medium flow path formed in the internal combustion engine, upon or before starting of the internal combustion engine.

17. A method according to claim 14, wherein an intake air amount of the internal combustion engine that is preheated by the

engine preheating apparatus is set to a value larger than the intake air amount of the internal combustion engine that is not preheated.

18. A method for controlling an internal combustion engine, comprising the steps of:

preheating the internal combustion engine upon or before starting thereof; and

retarding an ignition timing of the internal combustion engine that is preheated as compared with the ignition timing of the internal combustion engine that is not preheated.

19. A method according to claim 18, wherein a degree of retarding the ignition timing is changed according to a temperature of the internal combustion engine upon completion of preheating.

20. A method according to claim 18, wherein the step of preheating the internal combustion engine comprises:

introducing a heating medium into the internal combustion engine,

accumulating heat of the heating medium in a heat

accumulating apparatus; and

supplying the heating medium from the heat accumulating apparatus, to a heating medium flow path formed in the internal combustion engine, upon or before starting of the internal combustion engine.

21. A method according to claim 18, wherein an intake air amount of the internal combustion engine that is preheated is set to an amount larger than the intake air amount of the internal combustion engine that is not preheated.

22. A method for controlling an internal combustion engine, comprising the steps of:

preheating the internal combustion engine upon or before starting thereof;

setting an air-fuel ratio of the internal combustion engine that is preheated to a value higher than the air-fuel ratio of the internal combustion engine that is not preheated; and

retarding an ignition timing of the internal combustion engine that is preheated as compared with the ignition timing of the internal combustion engine that is not preheated.

23. A method according to claim 22, wherein the air-fuel ratio is changed according to a temperature of the internal combustion engine upon completion of preheating.

24. A method according to claim 22, wherein a degree of retarding the ignition timing is changed according to a temperature of the internal combustion engine upon completion of preheating.

25. A method according to claim 22, wherein the step of

preheating the internal combustion engine comprises:

introducing a heating medium into the internal combustion engine,

accumulating heat of the heating medium in a heat accumulating apparatus; and
supplying the heating medium from the heat accumulating apparatus, to a heating medium flow path formed in the internal combustion engine, upon or before starting of the internal combustion engine.

26. A method according to claim 22, wherein an intake air amount of the internal combustion engine that is preheated is set to a value larger than the intake air amount of the internal combustion engine that is not preheated.